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Research Note

Sarcocystis felis in Captive Cheetahs (*Acinonyx jubatus*)

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ABSTRACT: *Sarcocystis felis* was detected in the musculature of 7 of 10 cheetahs (*Acinonyx jubatus*) from a captive breeding colony in Winston, Oregon. This is the first report of *Sarcocystis felis* from cheetahs.

KEY WORDS: *Sarcocystis felis*, cheetah, *Acinonyx jubatus*.

Species of the genus *Sarcocystis* have a predator–prey cycle consisting of a definitive carnivore (predator) host and intermediate herbivore (prey) host. In the intermediate host, schizonts or muscle sarcocysts are the result of asexual reproduction, and in the definitive carnivore host, sexual reproduction occurs in intestinal cells, with oocysts or sporocysts passed in feces (Dubey et al., 1989). Carnivores infrequently develop sarcocysts in muscles or function as intermediate hosts. Definitive hosts have not been identified for *Sarcocystis* spp. with sarcocysts in carnivore muscles. In North America, sarcocysts identified as *Sarcocystis felis* Dubey, Hamir, Kirkpatrick, Todd, and Rupprecht, 1992, have been reported from bobcats (*Felis rufus*), domestic cats (*Felis domesticus*), Florida panther (*Felis concolor coryi*), and cougar (*Felis concolor*) (Kluge, 1967; Kirkpatrick et al., 1986; Everitt et al., 1987; Edwards et al., 1988; Fiori and Lowndes, 1988; Hill et al., 1988; Greiner et al., 1989; Anderson et al.,

1992; Dubey et al., 1992). This report documents *S. felis* in the musculature of captive cheetahs (*Acinonyx jubatus*) from a wildlife facility in Winston, Oregon.

All cheetahs were part of a captive breeding program at Wildlife Safari, Winston, Oregon. All animals had been born in the United States, ranged in age from 5 to 14 yr, and had been in captivity all of their lives. Muscle biopsy specimens from 8 cheetahs, 1 male and 7 females, were obtained from the biceps femoris after administration of lidocaine. Necropsy specimens of biceps femoris were collected from 2 additional male cheetahs. Tissues were fixed in 10% buffered formalin, sectioned at 5 µm, and stained with hematoxylin and eosin. Tissues were examined microscopically (×400), and sarcocysts were counted within a 1-cm² marked section of randomly chosen tissue.

Additional muscle specimens were processed for electron microscopy by methods described previously (Foreyt, 1989) and viewed with a transmission electron microscope (Hitachi H600, Hitachi, Santa Clara, California 95044).

Sarcocysts of *S. felis* were detected in 7 of 10 cheetahs (Fig. 1). Mean size of 48 sectioned sarcocysts was 251 × 121 µm (range, 64–997 × 49–

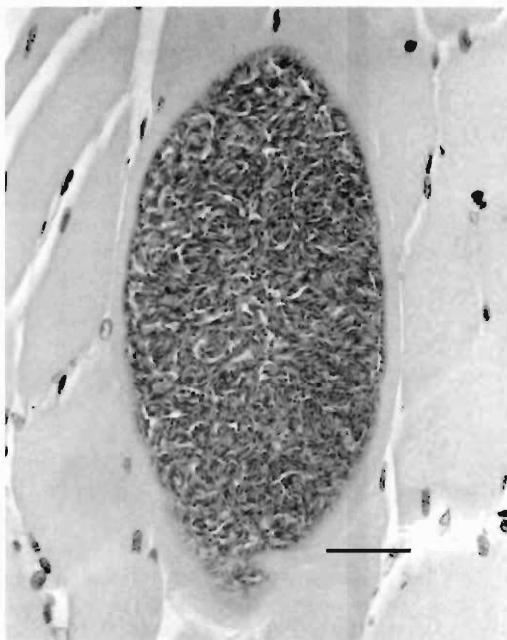


Figure 1. *Sarcocystis felis* in the biceps femoris of a cheetah. Scale bar = 50 μm .

220 μm). Mean intensity was 6.9 sarcocysts/cm². No inflammatory reaction was associated with the sarcocysts, and adjacent muscle fibers were histologically intact.

The septate sarcocysts (Fig. 2) were identified as *S. felis* based on published descriptions by Dubey et al. (1992). The primary vacuole membrane of the primary cyst wall was folded irregularly into short bumps and villar projections (Fig. 2).

Infections with *Sarcocystis* sp. in the musculature of carnivores are uncommon, because carnivores are the usual definitive hosts and herbivores are the usual intermediate hosts. In the present report, sarcocysts of *S. felis* were detected in 70% of the cheetahs sampled, but the importance of the infection could not be determined. Many of the cheetahs subsequently died from a variety of diseases, particularly renal and hepatic failure, and virtually all cheetahs exhibited signs of muscle wasting. Cheetahs lack genetic diversity (O'Brien et al., 1985) and are highly susceptible to infectious diseases such as feline infectious peritonitis virus and feline leukemia virus, which are capable of compromising the immune system of the host (Briggs and Ott, 1986; Briggs



Figure 2. Transmission electron micrograph of the cyst wall of *Sarcocystis felis* in the biceps femoris of a cheetah. Note the septum (S) and the folded parasitophorous vacuole membrane (PVM). Scale bar = 3 μm .

et al., 1986). The effect of a compromised immune system on the development of sarcocysts in the carnivore host has not been investigated (Edwards et al., 1988) but may be important. The life cycle of *S. felis*, including the definitive host, has not been documented.

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